PHOTOGRAPHIC INTERPRETATION REPORT

GORKIY ANTENNA RESEARCH AND DEVELOPMENT FACILITY USSR

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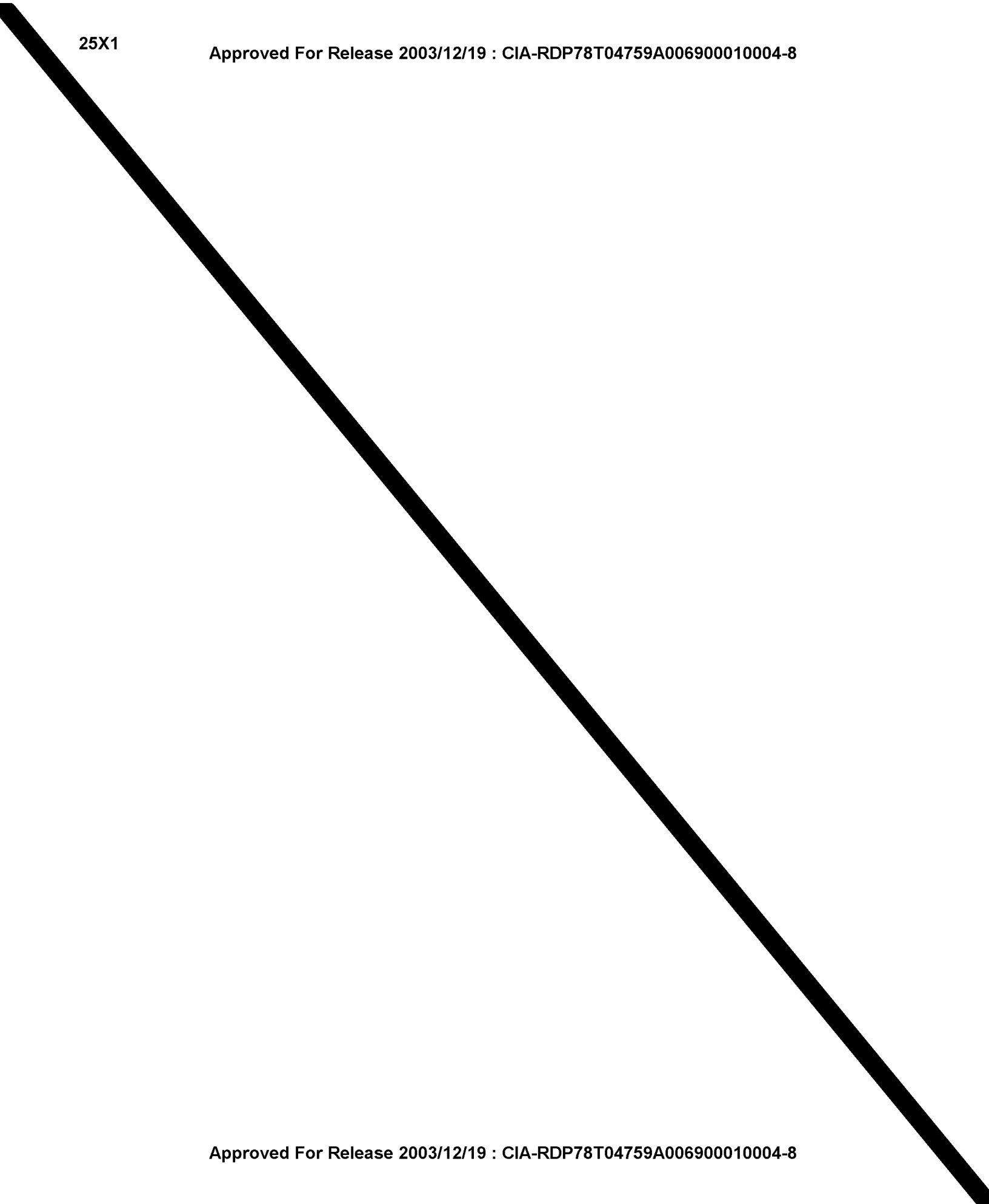
GROUP 1 EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION



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GORKIY ANTENNA RESEARCH AND DEVELOPMENT FACILITY, USSR

SUMMARY

A research and development facility, located on the western side of Gorkiy, is used for the assembly and test of unusually large rotatable radar antennas. Several generations of antenna types have been tested, and continued construction activity suggests other types will be constructed and tested at this facility.

At least 3 generations of radars are currently in place. These include 2 unusually large rotatable antennas having ellipsoidal/parabolic reflectors, each 105 feet high and 165 feet long. Including the building on which they are emplaced, they have the equivalent total height of at least a 14 story building.

Also present are 9 standard size Tall King antenna buildings which do not include a larger and a possibly smaller variant of the standard size Tall King. Other antennas, including a probable new type of height finder, are also present.

DISCUSSION

An active antenna research and development facility, occupying approximately 37 acres which are fenced, is on the western side of

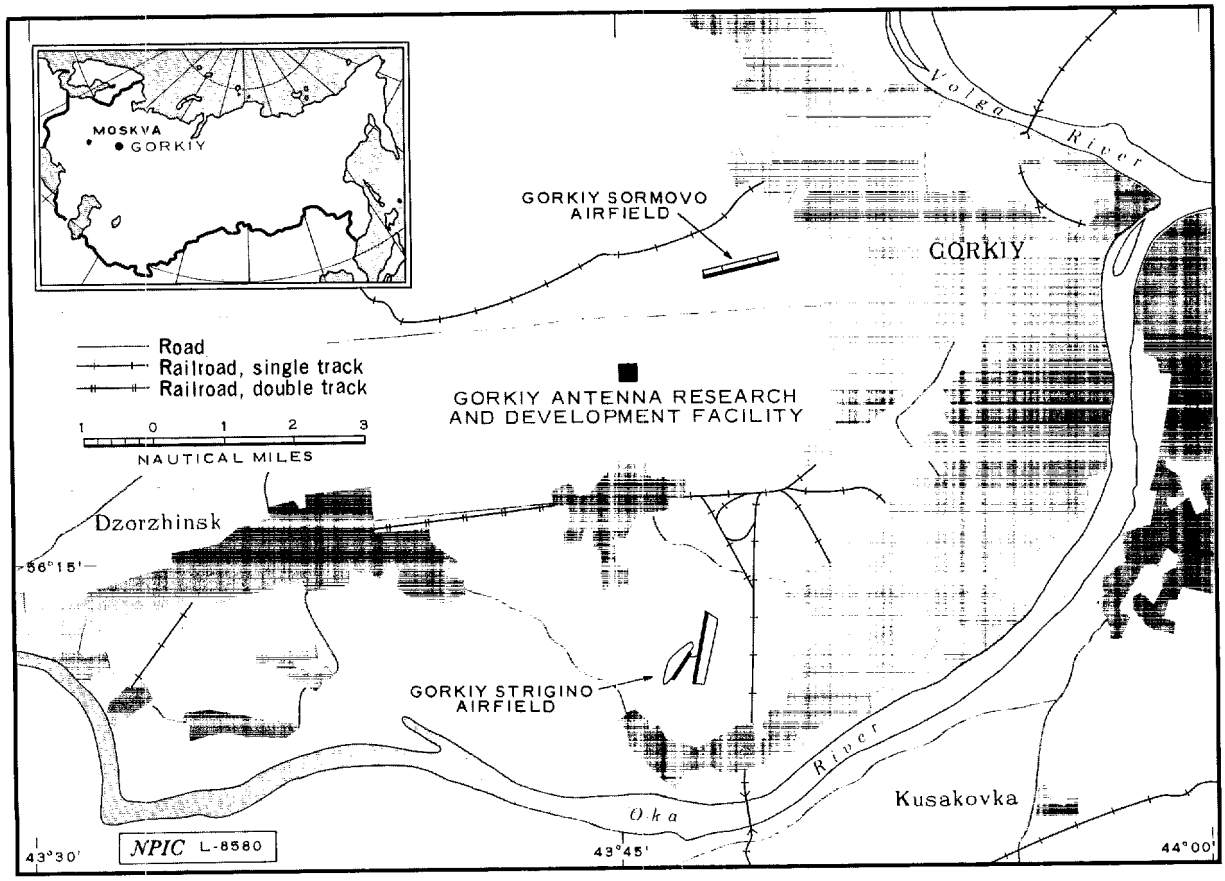
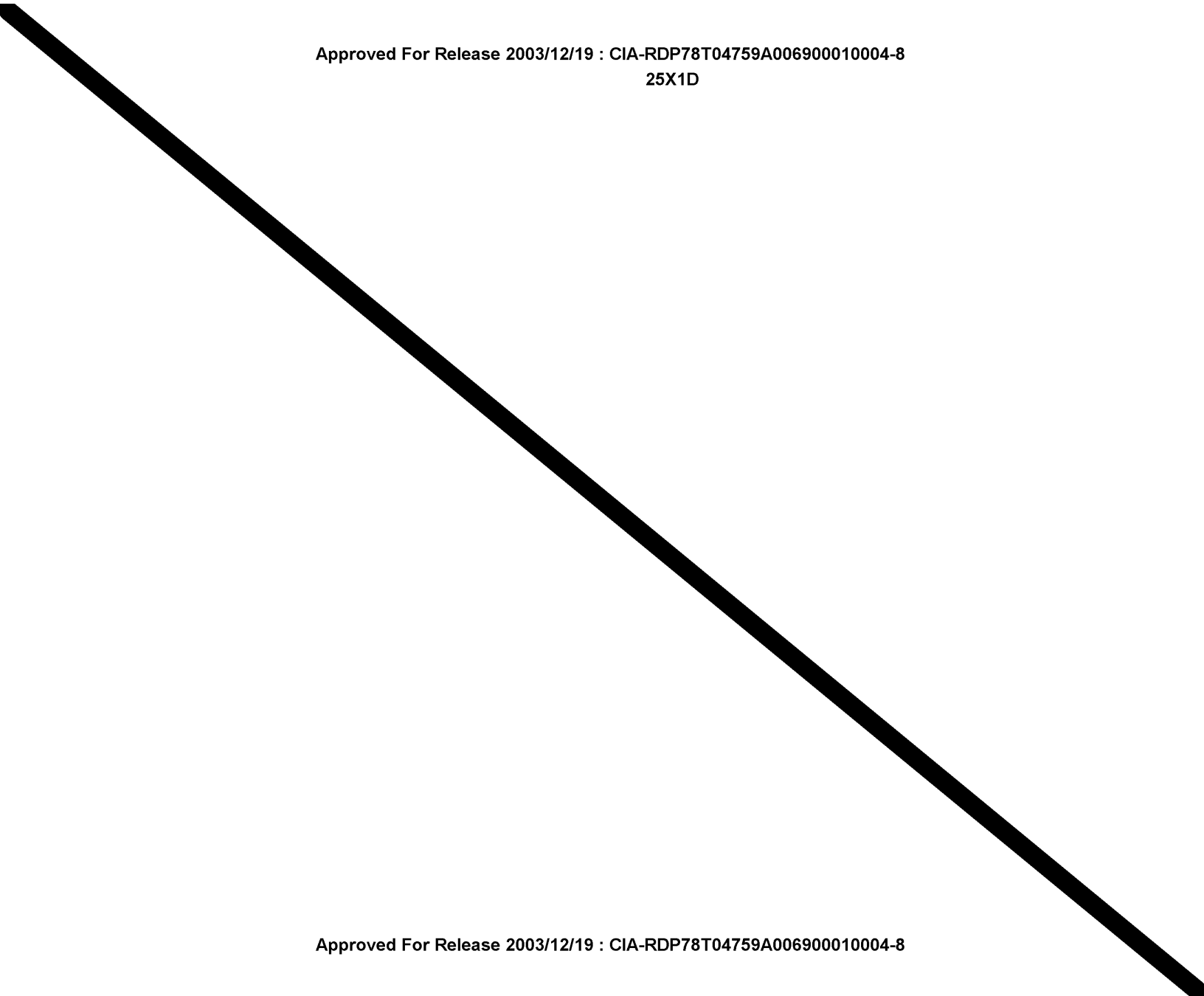
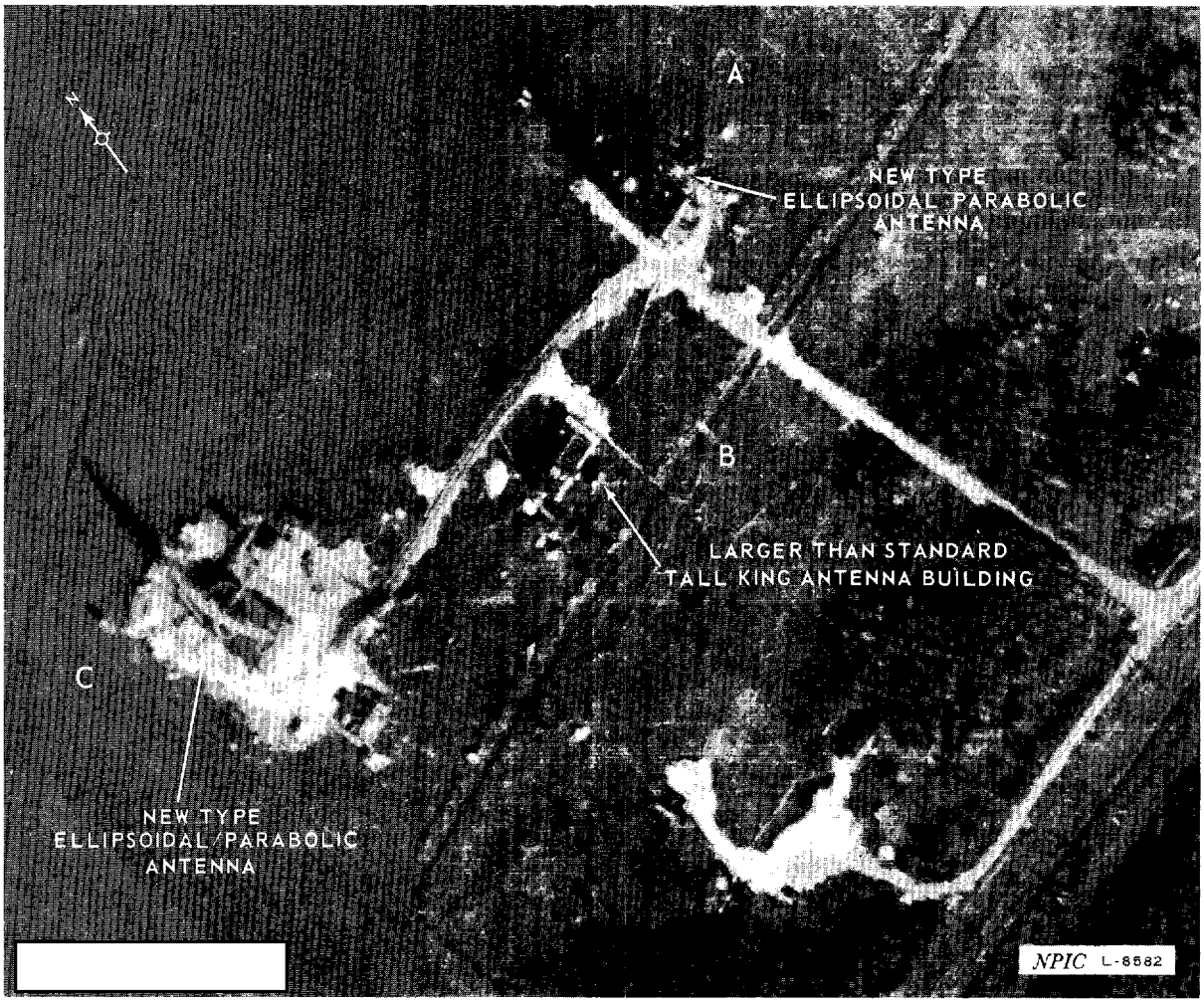


FIGURE 1. LOCATION OF GORKIY ANTENNA RESEARCH AND DEVELOPMENT FACILITY.





25X1D

FIGURE 3. ANTENNA POSITIONS A, B, AND C AT GORKIY ANTENNA RESEARCH AND DEVELOPMENT FACILITY.

Gorkiy, USSR. It is situated in a patch of woods 2.2 nautical miles (nm) southwest of the center of Gorkiy Sormovo Airfield at 56-17-40N 043-45-15E (Figure 1).

25X1D

Chronological studies

25X1D

continuing through the present time, indicate at least 3 generations of radar antennas have been assembled and tested at this facility. A careful study of ground anchor positions indicates as many as 18 antennas have been present at one time or another.

For discussion purposes, the antenna sites are arranged in 4 general groups.

Group 1 (Items A and C on Figures 2, 3, and 4) includes 2 newly identified ellipsoidal/parabolic antennas that are huge for rotatable arrays. Group 2 (Item M on Figure 2; and Figure 5) is a single cylindrical parabolic antenna which is possibly a campanion height finder for the antennas in Group 1. Group 3 (Items B, D through L, and N on Figure 2 and Item B on Figure 3) is composed of standard size Tall King antennas or antenna buildings,

and at least 2 variants, including a size larger and a size possibly smaller than the standard Tall King. Group 4 (Items P, Q, and R on Figure 2) is referred to as the attendant group because it appears to be utilized for support.

Community interest in this facility has been principally focused on the 2 huge antennas annotated A and C on Figures 2 and 3, and shown on Figure 4. Consequently, they are the prime subject of this report.

The mensural data included in this report was compiled by the NPIC Technical Intelligence Division, but is not as finite as the drawings may indicate. The various antenna shapes and heights shown in the line drawings are interpretations based on shadow analysis which has inherent errors including those due to image displacement. It is reasonable to expect, therefore, that other interpretations, especially those of height, could be as accurate as those included in this report.

The negation dates of components of this facility, where obtainable, are included under their respective headings. The negation date of the facility, as a whole, however, cannot be determined from available photography.

GROUP 1. ELLIPSOIDAL/PARABOLIC ANTENNAS

General

The antennas annotated A and C on Figures 2 and 3 are unusually large for rotatable types. Radar antennas of this size are not so unusual when fixed on the ground but they become unusual when positioned atop a building and rotated. The antenna reflectors annotated A and C on Figure 3 are both approximately 165 feet long and 105 feet high and each is set on a ring drive gear which is atop a building approximately 40 feet high. This results in a total height [redacted] the equivalent of at least a 14-story building. Their size equates to an antenna about one-third the height and one-half the length of the DOG HOUSE antenna (350 feet by 325 feet) positioned atop a 3 story building. The feed alone approximates the height of a 3-story building. Wind loading consequently becomes critical which is why the antenna reflector is constructed from open meshwork. This is also why it is difficult to determine and correctly draw its exact shape from available photography (Figure 4).

Although antennas A and C are of the same size and configuration, shadow analysis indicates that certain structural members on antenna A are positioned differently. Also, the reflector meshwork on antenna A may be closer together than that on reflector C. The feed structure on antenna A has never been seen and it could also be different from that of C.

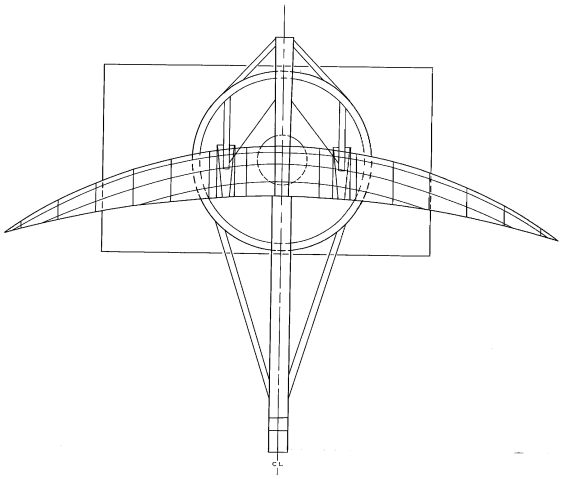
Chronology

Excavation for the foundation of the antenna building designated A on Figures 2 and 3 was first observed [redacted] The building was complete on [redacted] and the antenna may have been present [redacted] The antenna was definitely present [redacted]

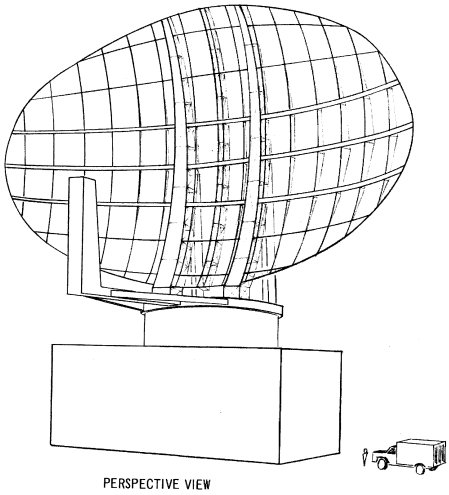
Excavation for the foundation of the antenna building designated C on Figures 2 and 3 was first observed [redacted] and the antenna was first observed [redacted] Since the antenna was not in place [redacted] the construction period required for antennas A and C from building erection to antenna emplacement was about 18 months.

Mensural Data

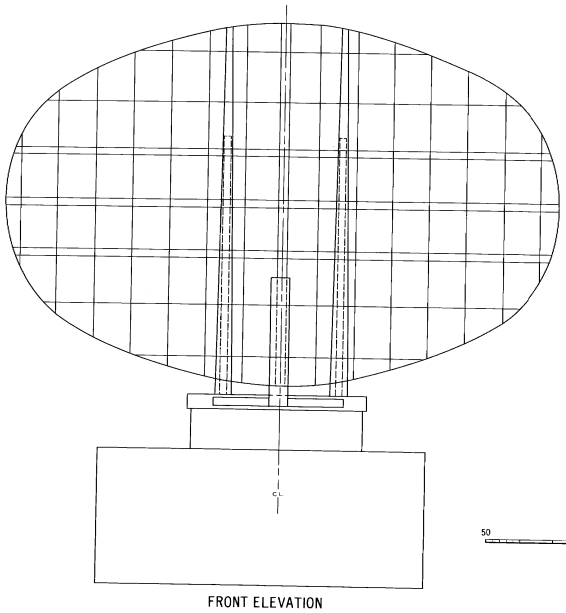
All obtainable mensural data has been reduced to a carefully executed set of scaled line drawings (Figure 4). Dimensions may be measured directly from these drawings.



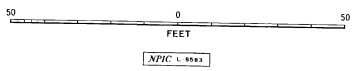
PLAN VIEW



PERSPECTIVE VIEW



FRONT ELEVATION



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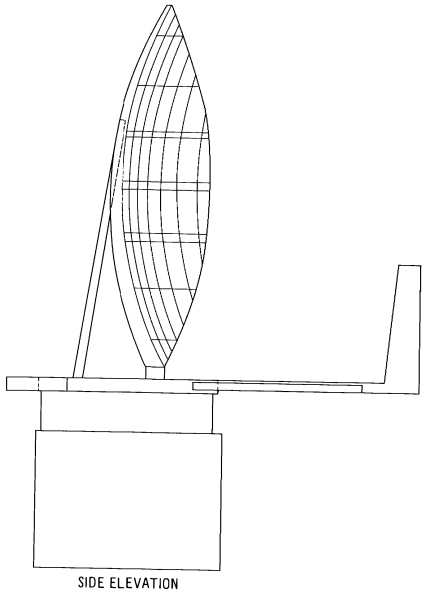

SIDE ELEVATION

FIGURE 4. NEW ELLIPSOIDAL/PARABOLIC ANTENNA OBSERVED AT GORKIY ANTENNA RESEARCH AND DEVELOPMENT FACILITY ANTENNA POSITIONS A AND C.

25X1D

25X1D

Earlier mensural data, prior to the execution of engineering drawings, indicated that 2 antenna sizes may be present, one perhaps 100 feet high by 200 feet long. Measurements utilizing all pertinent photography, however, indicate only 1 antenna size which is 105 feet high and 165 feet long.

GROUP 2. CYLINDRICAL/PARABOLIC ANTENNA

General

This antenna is designated Item M on Figure 2 and shown on Figure 5. Apparent parabolic sections are arranged in a straight line 110 feet long. Together, they vaguely resemble a quarter section of a cylindrical tube. Its time frame of construction generally parallels that of the ellipsoidal/parabolic antenna A described above which suggests the possibility that it is a companion component to antenna A.

25X1D

The antenna is only vaguely identifiable on available photography as an antenna; therefore, the drawings in Figure 5 are only approximate likenesses. It is clear that the central supporting mast of the antenna has the same configuration and is guyed like a Tall King and that the antenna length is approximately 110 feet. It is not clear, however, whether the parabolic sections shown along the length of the supporting boom look somewhat upward as shown, nor can their exact height, section spacing, or radius of curvature be determined.

25X1D

25X1D

Like antennas A and C, antenna M is positioned atop a building and rotates as indicated by the various angles at which the boom has been seen. Unlike antennas A and C, however, it is supported by 2 large buildings other than the 1 on which the antenna is positioned. One of these buildings is in the late stage of construction (Figure 5).

25X1D

25X1D

Chronology

25X1D

The antenna M supporting building was observed in the mid stage of construction in [redacted] and the antenna itself was first observed [redacted]

Mensural Data

All mensural details have been reduced to 2 plan views drawn to scale and shown in Figure 5.

GROUP 3. TALL KING ANTENNAS AND VARIANTS

These Tall King antennas are designated Items B, D through L, and N on Figure 2, and Item B on Figure 3.

Annotations I through L are associated with 9 Tall King antenna support buildings. These 9 buildings have nearly the same configuration [redacted] Their size, their number, and the spacing of the guy anchor positions indicate that this is the research and development facility for what is now considered to be the standard 115-foot by 40-foot Tall King antenna. The largest number of Tall King antennas actually observed on these buildings at any one time was 4.

Larger Than Standard Tall King Antenna

A so-called "super" Tall King building is designated B on Figures 2 and 3. This larger building is 70 feet [redacted] which may be compared to the standard [redacted] building. The wider spacing of the guy anchor positions led to the suspicion that a larger variant of the Tall King Antenna had been constructed on this building. Photography of poor interpretability [redacted] showed an antenna lying on the ground of Tall King shape and proportions but measuring approximately 145 by 50 feet.

The interpretability of the available photography is not suitable for the negation of this facility. The antenna support building was first observed on photography [redacted]

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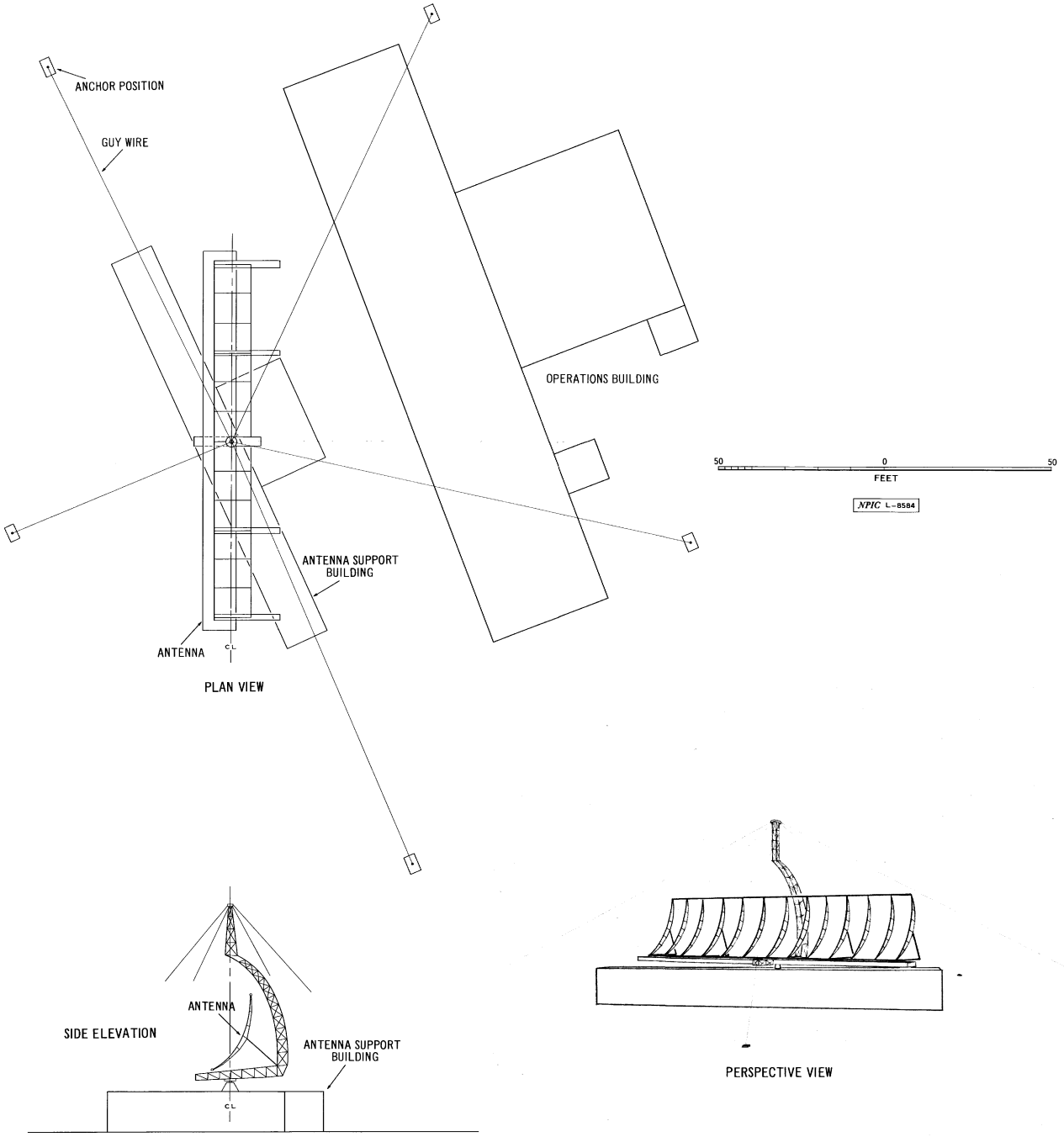

FIGURE 5. NEW CYLINDRICAL PARABOLIC ANTENNA OBSERVED AT GORKIY ANTENNA RESEARCH AND DEVELOPMENT FACILITY ANTENNA POSITION M.

25X1D but the presence of the antenna could not be confirmed until photography 25X1D The antenna was last seen erected on the building 25X1D was seen lying on the ground 25X1D and has not been observed on photography since.

Possibly Smaller Than Standard Tall King Antenna

A possibly smaller than standard size Tall King antenna is positioned on the building which is annotated N on Figure 2. The antenna has an elliptical parabolic reflector 70 feet wide, but the height cannot be determined on available photography. Lack of height determination precludes a positive identification that the antenna dimensions are proportional to the standard Tall King antenna.

This antenna is rotatable and is positioned atop a building, 25X1D which may be compared to the standard Tall King building 25X1D Also, the antenna does not appear to be guyed supported.

The antenna can be negated on photography 25X1D and was first observed 25X1D 25X1D

GROUP 4. ATTENDANT (SUPPORT) ANTENNAS

The antennas annotated P, Q, and R on Figure 2 apparently support the research and development facility.

Antenna Position P

The antenna at position P on Figure 2 is a circular parabolic dish which is constructed of open meshwork, has a diameter of approximately 25X1D and a triple-braced feed at its focal point. It is non-rotatable, not positioned on a building, but is fixed on supports in the ground and is oriented toward the northeast at approximately 25X1D

This antenna was observed under construction on photography 25X1D 25X1D and the antenna was in position on photography 25X1D 25X1D

Antenna Position Q

No antenna has been observed on available photography at antenna position designated Q on Figure 2, but the spacing of ground anchor positions indicates a tall guyed tower was here at one time.

Antenna Position R

A single guyed tower of moderate height, observed at antenna position R on Figure 2 is on the edge of a woods near the north side of the research and development facility. This is an average distance of 2,580 feet from antennas designated A through L and an average distance of 1,720 feet from antennas designated M, N, and P. Trees obscure the shadow of the antenna so its height is undetermined.

This guyed tower may be the calibration tower for the research and development facility.

REFERENCES

PHOTOGRAPHY

25X1D [redacted]

MAP OR CHART

ACIC series, scale 1:200,000

REQUIREMENT

NSA/P0432/R93-66

NPIC PROJECT

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